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(54) DEVICE FOR CONNECTING A CONSUMER'S APPLIANCE
 TO A VALVE HEAD

- (71) We, SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V., a company organised under the laws of The Netherlands, of 30 Carel van Bylandtlaan, The Hague, The Netherlands, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- The present invention relates to connecting devices and more precisely to devices allowing the connection of a stationary element such as the mouth of a consumer's appliance to the valve head of a container such as a gas bottle.
- The connection of such an appliance to a round-shaped valve head of a gas bottle or the like should be so designed as to make it possible for the appliance to make a turn relative to the valve head, while the disconnection of the appliance should only be able to be effected by a simple and positive manipulation not liable to happen accidentally. The connecting device should furthermore be sufficiently fitting that a seal may be provided between the appliance and the valve head and formed for example by an O ring is not disturbed by the possible relative movements of the appliance during normal use. It is also desirable for the device to offer a sufficient resistance to prevent disconnection of the appliance in the event of axial or oblique forces considerably higher than the forces resulting from normal use.
- The object of the invention is to provide a connecting device designed to meet these requirements and to this end according to the invention a connecting device as defined above comprises a connecting element and two steel wires which are symmetrically arranged about an axis of the element and which are linked together at opposite extremities thereof which wires are arranged in a transverse slot provided in the element to be connected to the valve head and which are suitable to fit tangentially into an annular groove made in the valve head, at least one of adjacent extremities of the wires being accessible from the outside to enable them to be pushed inwards towards the axis of the element in order to allow the disconnection of the element by a lateral movement of the wires outwardly with respect to the axis of the element.
- In a preferred arrangement, at least one of the adjacent extremities of the two steel wires are linked by means of a connecting piece which is able to be operated as a pusher by inward movement thereof causing in turn said outward movement of the wires.
- Each such pusher may be hingedly fitted to the element around a vertical or horizontal axis parallel or perpendicular to the axis of the element, so as to form a lever to help the operator to push radially inwards the corresponding extremities of the two wires.
- The invention will be further illustrated with reference to the accompanying drawings wherein:
- Figure 1 is a diagrammatic cross section of a connecting device according to the invention,
- Figure 2 is a cross section taken along the line II-II of Figure 1, and Figure 3 is a partial cross section illustrating an alternative embodiment of the connecting device shown in Figures 1 and 2. In the figures, reference numeral 10 designates a double-wire device design for the connection of a stationary element 12, such as a stopper or a tubular mouth of an appliance (not shown) to the valve head 14 of a container 16 such as a bottle or cartridge of pressurized gas.
- In the embodiment shown, the element

12 is formed by a stopper, but it will be understood that the connecting device 10 may be utilized for any other element, whether tubular or not, that might have to be attached in immovable fashion to the valve head 14. It is important only for this element 12 to have an internal hollow space 18 of cylindrical shape with a round base wherein at least part of the valve head 14 can be accommodated.

This head 14 is of round shape and is provided in a conventional manner, near its extremity 20, with an annular retaining groove 22 with parallel sides. The edge of the extremity 20 is chamfered as shown by 24.

The device 10 comprises essentially two steel wires (or more exactly two lengths of steel wire) of the type known as "piano wire" 26a and 26b which are symmetrically arranged each in a slot 28a or 28b provided in the element 12 at the level of the groove 22 of the head 14 when the latter is correctly engaged in the hollow space 18. The slots 28a and 28b are such that each steel wire 26 is able in the normal position to fit tangentially into the groove 22 with its central part 30. In the embodiment shown, the slots 28 are transverse and open at the lateral wall of the element, but it will be understood that they could be otherwise designed and that only the opposing extremities of these slots could be open at opposite lateral wall parts of the element 12.

Each wire 26 is bent in an S-shape at each of its extremities 32 and 34 so that these extremities are aligned and close to the bottom 36 of the corresponding slot 28. Each of the extremities 32 and 34 of each of the wires 26a and 26b extends towards the inside of the element 12 and is linked by any means such as a connecting piece or pusher 38 at the extremity opposite to the other wire.

The co-operation of the wire extremities 32 or 34 with the bottom 36 of the slot 28 and the link 38 formed between these extremities ensure that the device 10 is centered in the element 12. In the normal position, the central parts 30 of the wires 26a and 26b are parallel and separated by a distance approximating the interior diameter of the groove 22.

In a possible further alternative embodiment (not shown), one of the pairs of extremities 32 or 34 is arranged inside the element 12 and only the other pair of extremities is accessible from outside.

The shape of each wire 26 and the distance between the pushers 38 and the element 12 are such that an opposing pressure (arrows F) of the pushers 38 will, by outward movement of the wires 26a and 26b, cause a considerable deformation

during which the central parts 30 of the wires will bend and separate from each other by a distance greater than the diameter of the cylinder exterior surface of the valve head 14, as indicated by the 70 dotted lines in Figure 2.

In the embodiment shown in Figure 3, the pusher(s) 38 is (are) mounted pivotally on the element 12 at 40 by any suitable means and each of the opposite extremities 32 or 34 of the wires 26a and 26b is inserted into the pusher 38 near the pivotal axis 40 in such a manner as to limit the force F required to cause the wires to flare. The pivotal axis 40 of the pushers 38 80 may be perpendicular or parallel to the axis of element 12.

The use of the device 10 is simple to understand: By inserting the head 14 into the hollow space 18 of the element 12, 85 the central parts 30 of the wires 26 slide on the chamfer 24 and separate before assuming their position in the groove 22. The element 12 is then connected to the head 14.

This connection permits the element 12 to rotate on the head 14. By suitably selecting the width of the slots 28 and the groove 22, the diameter of the wires 26 and their shape, it is possible to obtain a sufficiently precise connection to enable an annular ring (not shown) which may be provided between the element 12 and the head 14 to perform its function as a seal, under normal conditions of use.

In order to disconnect the element 12, the operator pushes the pushers 38 towards one another and thereby causes the wires 26 to move outwardly. These then separate by a sufficient distance to allow the element 12 to be disengaged from the head 14.

The resistance to disconnection of the device 10 is dependent on the resistance to shearing of the wires 26. By suitably selecting the minimum section of the wires 26 for a certain steel, a connecting device is obtained which is capable of resisting a given traction.

It will be understood that the invention is not limited only to the embodiment described above and that numerous modifications, in particular as regards the shape of the wires 26, the arrangement of the slots 28, the design of the pushers 38, may be envisaged without exceeding the scope of the present invention.

WHAT WE CLAIM IS:—

1. A device for connecting to a valve head of a container comprising a connecting element and two steel wires which are symmetrically arranged about an axis of the element and which are linked together at opposite extremities thereof which wires are arranged in a transverse slot provided 130

in the element and which are suitable to fit tangentially into an annular groove made in the valve head, at least one of adjacent extremities of the wires being
5 accessible from the outside to enable them to be pushed inwards towards the axis of the element in order to allow the disconnection of the element by a lateral movement of the wires outwardly with respect
10 to the axis of the element.

2. A connecting device as claimed in claim 1, wherein at least one of adjacent extremities of the two steel wires are linked by means of a connecting piece
15 which is able to be operated as a pusher by inward movement thereof and causing in turn said outward movement of the

wires.

3. A connecting device as claimed in claim 2, wherein both linked extremities
20 of the two wires are accessible from the outside and linked by a connecting piece.

4. A connecting device as claimed in either claim 2 or 3, wherein each connecting piece is hingedly fitted to the element
25 so as to form a lever to help the operator to push the corresponding extremities of the two wires inwards towards the axis of the element.

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